



# Integrated Functional Appraisal (IFA) Earth Sciences Division

September 28, 2005



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## Executive Summary

The Environment, Health, and Safety (EH&S) Division of Lawrence Berkeley National Laboratory (LBNL) conducted an integrated functional appraisal (IFA) of the Earth Sciences (ES) Division during May and June 2005. The scope of the IFA was to review (1) a comprehensive sampling of technical work conducted under formal authorizations such as increased-hazard work requiring an Activity Hazard Document (AHD), a Radiological Work Authorization (RWA), etc.; (2) a representational sampling of technical work conducted under line management authorization (such as routine laboratory and shop work); and (3) a representational sampling of office work.

IFA team members were selected based on their expertise in the following fields: radiation protection, fire safety, industrial hygiene, industrial safety, electrical safety, occupational health, waste management, and biosafety. The team held several meetings, which included an opening meeting, laboratory space inspections, office space inspections, and a closeout meeting.

The results of the IFA indicate that, overall, the ES Division has a strong Environment, Safety, and Health (ES&H) program that is effective in identifying and controlling hazards, and no single location was identified as containing excessive findings. During the walkthroughs, the IFA team identified several noteworthy practices including the development of a Lab Lead Principal Investigator (LLPI) system for each lab space, given the ES Division's matrix staff arrangement; the development of lab safety primers that describe hazards in ES space; evidence of staff commitment to maintain and improve housekeeping in many areas; and recognition from the Berkeley Site Office (BSO) regarding ES Division Safety Coordinator Jil Geller's proactive approach to sustaining and improving the safety culture within the Division. In terms of Occupational Safety and Health Administration (OSHA) compliance, increased vigilance should continue in the areas of seismic safety, electrical safety, and ergonomics.

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## **1 Introduction**

The Environment, Health, and Safety (EH&S) Division of Lawrence Berkeley National Laboratory (LBNL) conducted an Integrated Functional Appraisal (IFA) of the Earth Sciences (ES) Division during May and June 2005. The IFA is a key component of LBNL's Integrated Safety Management (ISM) system and forms one of the three tiers of the Laboratory's self-assessment program. The other two tiers include Management of Environment, Safety and Health (MESH) reviews and individual division's Self-Assessments (SA). The EH&S Division conducts an IFA for each Laboratory division every three years. The ES Division's last IFA was performed in 2002.

### **1.1 IFA Purpose**

The purpose of the IFA was to conduct an Environment, Safety, and Health (ES&H) technical review of the ES Division's work activities and operations.

### **1.2 Scope**

The scope of the IFA was to review

- Technical work conducted under formal authorizations such as increased-hazard work requiring an Activity Hazard Document (AHD), Radiological Work Authorization (RWA), etc.
- Technical work conducted under line management authorization (such as routine laboratory and shop work). A representational sampling of ES Division space was reviewed.
- A representational sampling of ES Division office space.

### **1.3 Compliance Emphasis**

This year's IFA emphasized OSHA compliance and, in particular, electrical safety compliance. The Federal OSHA audit in January 2004 identified 908 OSHA instances across all LBNL divisions and 1,393 institutional instances, which altogether total 2,302 instances. Of the 908 instances, 11 were related to ES Division space; they were closed out or corrected in a timely manner by the middle of the year (2004).

In addition to general OSHA compliance, LBNL has been sensitive to electrical safety, given recent electrical related injuries and near misses at DOE complexes. For this reason, DOE recently conducted an electrical safety audit of all Berkeley Lab-occupied space in May 2005. In preparation for this audit, individual divisions conducted preliminary

inspections. The ES Division's IFA included the findings from this inspection as the primary focus for identifying electrical hazards (see Appendix E). Electrical safety engineers attended the actual IFA inspections; however, the primary electrical findings were identified immediately prior to the kickoff of the ES Division's IFA during the pre DOE electrical inspections.

## **2 Appraisal Process**

### **2.1 Team**

#### **2.1.1 *Selection***

Team members were selected based on their expertise in the following fields: industrial hygiene, industrial safety, radiation protection, fire safety, electrical safety, waste management, occupational health, and biosafety. As experts in these fields, team members have knowledge of and experience in identifying the primary hazards posed by ES Division work. The Berkeley Site Office (BSO) representative for the ES Division also participated in the IFA.

- Electrical safety: Robert Candelario and Mike Bell
- Biosafety: Bruce King
- Fire protection: Gary Piermattei
- Industrial hygiene: Rob Connelly
- Occupational health: Cathy Wentworth
- Occupational safety: Matt Kotowski
- Radiation protection: Bob Fairchild and Ted De Castro
- Waste management: Howard Hansen
- DOE Berkeley Site Office: Carol Ingram

#### **2.1.2 *Member Roles and Responsibilities***

All team members were responsible for reporting any ES&H concern they identified, regardless of their field of expertise. Subject matter experts were asked to review the applicable databases and ES Division authorizations with respect to their field of expertise. The team leader had the additional responsibilities of coordinating meetings, communicating results to ES Division staff, and preparing reports.

### **2.1.3 Meetings**

The team held several meetings, which included an opening meeting, laboratory space inspections, office space inspections, and a closeout meeting. Meetings were held on the following schedule:

- May 12, 2005: Opening meeting. Attendees included: Bob Candelario, Rob Connelly, Bob Fairchild, Jil Geller, Howard Hansen, Carol Ingram, Matt Kotowski, Gary Piermattei, and Cathy Wentworth.
- June 1, 2005: Inspection of lab, shop, and office spaces in Buildings 64, 70, and 70A attended by Bob Candelario, Rob Connelly, Ted De Castro (70A-4463C), Bob Fairchild, Jil Geller, Howard Hansen, Carol Ingram, Matt Kotowski, Gary Piermattei, and Cathy Wentworth.
- June 7, 2005: Inspection of lab and office spaces in Buildings 70, 70A, and 51F attended by Rob Connelly, Bob Fairchild, Jil Geller, Howard Hansen, Carol Ingram, Matt Kotowski and Cathy Wentworth.
- June 9, 2005: Inspection of lab and office spaces in Buildings 70A and 90 attended by Mike Bell, Rob Connelly, Jil Geller, Matt Kotowski, Gary Piermattei and Cathy Wentworth.
- Closeout meeting

## **2.2 Defining Appraisal Areas**

### **2.2.1 Document and Database Reviews**

Appropriate subject matter experts on the IFA team reviewed formal authorizations and databases:

- Bob Fairchild reviewed radiation-related authorizations including Radiological Work Authorizations (RWA), Radiological Work Permits (RWP), Sealed Source Authorizations (SSA), and Low Activity Source (LAS) authorizations.
- Ted De Castro reviewed x-ray authorizations.
- Bruce King reviewed database lists of Biological Use Authorizations (BUA) and Biological Use Registrations (BUR).



- Howard Hansen reviewed Benchtop Acid Neutralization Procedures (BANP) and lists of Satellite Accumulation Areas (SAA) and Mixed Waste Satellite Accumulation Areas (MWSAA). Since SAAs are reviewed quarterly and to help limit duplicated effort, the quarterly SAA inspection conducted on 4/21/05 was used for purposes of this IFA.
- Rob Connelly reviewed the following databases: Hazards, Equipment, Authorizations, and Reviews (HEAR); Supervisor's Accident Analysis Report (SAAR); LBNL Corrective Action Tracking System (LCATS); and training. He also reviewed results from past inspections (MESH reviews, IFAs, self-assessments, and Occupational Safety and Health Authorization [OSHA] inspections).

#### **2.2.2** *Identification of Facility-Level Operations*

The ES Division does not have facility-level authorizations that require *Safety Analysis Documents*. There are no environmental permits or authorizations specific to the ES Division; however, site wide permits, sewer discharges, and air emissions from all buildings apply to all occupied space by ES Division personnel .

#### **2.2.3** *Identification of Medium and High-Hazard Spaces and Operations*

The IFA team leader, Rob Connelly, and the ES Division ES&H Coordinator, Jil Geller, met to identify spaces where formal work authorizations are in effect (i.e., medium- and high-hazard spaces). Such spaces are in Buildings 51F, 64, 70, and 70A.

#### **2.2.4** *Identification of Higher Potential Line Management Authorized Work-Technical Work Spaces*

The ES Division is unique in that staff scientists may conduct field research in potentially any part of the world including territorial and international waters; for this reason, the ES Division has developed Off-Site Safety and Environmental Protection (OSSEP) Plans. See Appendix B for a complete list of the ES Division's OSSEP Plans. The OSSEP Plans are reviewed by line management within the ES Division. For purposes of the IFA, the team reviewed the entire list of OSSEP Plans and identified one for further review by the team entitled, "Ocean Biogeochemical Processes Group: Work at Sea." The team found this document to be well prepared and addressed hazards adequately. There were no IFA related findings with respect to this document. Prior to the formal IFA kickoff, EH&S (Rob Connelly, Jack Salazar, Jim Floyd, and Bob Fairchild)

reviewed another OSSEP Plan entitled, “Peña Blanca Science Plan: Building Confidence in Yucca Mountain Performance Through the Peña Blanca Natural Analogue.” Although not part of the IFA, EH&S conducted an integrated review of this OSSEP, at the request of the ES Division. This was a collaborative effort to help identify hazards and controls related to this unique field research. Documentation for this review is on file and can be obtained by contacting Rob Connelly or Jack Salazar. These OSSEP Plans are representative of ES Division technical work conducted under line-management authorization.

#### **2.2.5** *Identification of Representative Nontechnical Work Space*

Rob Connelly and Jil Geller determined that office spaces in Buildings 64, 70, 70A, and 90 would provide a representative sample of nontechnical work spaces that covers all five of the ES Division departments including Geochemistry, Ecology, Geophysics, Hydrogeology, and Field/Technical Support.

#### **2.2.6** *Scheduling of Space Reviews*

Rob Connelly identified dates and times for the IFA team, and proposed these dates to Jil Geller who scheduled space reviews of lab and shop space with the Lab Lead PIs.

### **2.3 Space Reviews**

Figure 1 identifies the ES Division space included in the space reviews. During the actual day of the space reviews, the IFA team met with the ES Division personnel who work in the space under review. The group introduced themselves, and ES Division personnel gave a brief summary of their work. The IFA team inspected the space for hazards, with an emphasis on OSHA and electrical hazards. Whenever possible, issues were resolved on the spot. IFA team members noted all issues identified, whether resolved or not, on inspection sheets. The team leader later compiled the results submitted on inspection sheets and emails, reviewed the data for accuracy, and deleted duplicate findings. The IFA team leader then submitted the findings to the IFA team and the ES Division safety coordinator for review on 7/12/05.

**Figure 1: IFA Space Review Locations**

<b>Earth Sciences Department</b>	<b>Department Head/ Line Manager</b>	<b>Locations</b>
Hydrology	Curt Oldenburg	70-114 70-114A
Geochemistry	Don Depaolo	70A-4429 70A-4431 70A-4419 70A-4421
Geophysics	Kurt Nihei	51F101 51F-102
Field and Technical Support	Ernie Majer	64-160 64-161 64-163
Ecology	Terry Hazen	70-158 70A-4459 70A-4461 70A-4462 70A-4463A 70A-4463B
Division Offices		64-160A 64-160B 70-127 70-127A 70-127B 70A-3317 70A-3317A&B 70A-3317D-H 70A3317J-M 90-1078 90-1106 90-1108 90-1116 90-2016A&B 90-2024P

### **3 Results**

#### **3.1 Categories**

The results of the IFA space reviews are described as noteworthy practices, observations, and findings. The categories are defined as follows:

##### **3.1.1 *Noteworthy Practices***

Practices and conditions that demonstrate exemplary initiative and effort, go beyond compliance, contribute additional EH&S value to the Lab, might be shared as Best Practices with others, etc.

##### **3.1.2 *Observations***

Practices and conditions that are not necessarily noncompliant as observed, but reflect opportunities for improvement or that with some additional level of effort could achieve Best Practices status.

##### **3.1.3 *Findings***

Clear cases of practices or conditions that do not comply with OSHA, building code, LBNL policy, etc. Findings are deficiencies and must be corrected.

#### **3.2 Facility Authorizations**

##### **3.2.1 *Safety Analysis Documents***

The ES Division does not occupy facilities that require the ES Division to have sole responsibility for obtaining a facility safety analysis.

##### **3.2.2 *Other Permits (BAAQMD, EPA, EBMUD)***

The ES Division does not have individual ownership of systems that requires the division to obtain Bay Area Air Quality Management District (BAAQMD), U.S. Environmental Protection Agency (EPA), or East Bay Municipal Utility District (EBMUD) permits; however, the ES Division does occupy laboratory space, such as in B70A where, for instance, an acid treatment system exists. The ES Division complies with LBNL policies with respect to disposal of material down sink drains.

Margaret Torn's group in 70A-4403 does have a United States Department of Agriculture (USDA) soil permit; however, this is not a facility-related permit.

### **3.3 Formal Work Authorizations**

The ES Division has a variety of formal authorizations including Activity Hazard Documents (AHDs), Biological Use Authorizations (BUAs), Radiological Work Authorizations (RWAs), Radiological Material Storage Areas (RSAs), Sealed Source Authorizations (SSAs), Generally Licensed Source Authorizations (GLAs), Low Activity Source Authorizations (LAS), an X-Ray Authorization, and Benchtop Acid Neutralization Procedures (BANPs). The authorizations are listed in Appendix A.

#### **3.3.1 Status of Renewals**

*AHDs.* The ES Division ES&H Coordinator, Jil Geller, coordinates the renewal of AHDs annually. A new document, AHD 2105, "*Single Location CO<sub>2</sub> Saturation Monitoring*," is currently in the approval process. All other AHDs are either current or presently in the renewal process.

*RWAs and other radiation-related authorizations.* The Operational Health Physics Group reviews and updates radiation-related authorizations every 12 or 18 months, depending on the hazard of the activities authorized. All radiation-related authorizations are current.

*Other authorizations.* Waste area listings and respiratory protection user certifications are all current.

*Biological Use Authorizations (BUAs).* BUAs involve Biosafety Level 2 work, are reviewed by the Institutional Biosafety Committee (IBC), and are maintained in the EH&S Industrial Hygiene biosafety office. The ES Division had one BUA at the start of this IFA, and added two BUAs during the IFA. Under these BUAs, only Biosafety Level 1 (BL1) work is conducted in ES Division space, and all BL2 is conducted in Life Science Division space. The older BUA (B107) was approved 10/03 and has been sent to the PI for renewal.

#### **3.3.2 Current Personnel**

Authorized workers are listed in AHDs, BUAs and radiation-related authorizations. Personnel from the ES Division update lists of authorized workers when AHDs or BUAs are renewed or

revised. Personnel from the Operational Health Physics Group update lists of authorized workers when radiation-related authorizations are renewed or revised. The principal investigator's signature on these documents certifies that only the listed personnel are authorized to work on the project.

### **3.3.3** *Training*

Classroom training requirements associated with formal work authorizations are identified through the job hazard questionnaire (JHQ). Authorized users and on-the-job training (OJT) requirements are listed in formal authorizations.

### **3.3.4** *Technical ES&H Issues Review*

As discussed in Section 1.2, the IFA team performed a comprehensive review of ES Division laboratories where work is performed under formal authorization. The team classified their results as:

- findings, or failures to comply with a regulatory requirement;
- observations, or opportunities for process improvement; and
- noteworthy practices.

The IFA team results are provided in Appendix C, Technical Environment, Safety, and Health Inspection Results; Appendix D, SAA Inspection Results; Appendix E, Electrical Inspection Results.

### **3.3.5** *Validation of Hazard Identification Database (HEAR or Equivalent)*

The Operational Health Physics Group maintains radiation-related authorizations in the RADAR database. The database is current.

The EH&S Division AHD coordinator, Larry McLouth, files AHD copies; this file is current.

BUA files and a data spreadsheet are maintained for the IBC in the EH&S biosafety office by Bruce King. These records are current.

The ES Division ES&H Coordinator, Jil Geller, keeps copies of all formal authorizations. The HEAR database is used to document formal authorizations.

### **3.4 Line Management (“Self-Authorization”) Space/Operations**

Operations requiring line management authorization are common throughout ES Division space. As discussed in Section 2.2.4, the IFA team reviewed one Off-Site Safety and Environmental Protection (OSSEP) Plan, and an integrated EH&S team reviewed another OSSEP just prior to the official IFA kickoff. The OSSEPs are safety plans for identifying and controlling hazards as part of line management authorized field research in the ES Division. See Appendix B for a complete list of the ES Division’s OSSEP Plans.

#### **3.4.1** *Is Line Management Authorized Work Properly Identified?*

Project staff have completed hazard assessment forms such as safety review questionnaires and OSSEPs to identify project hazards. The reviews indicate that the processes and hazards control are routine and conform to the ES Division’s Integrated Safety Management (ISM) plan. Thus, in accordance with PUB-3000, line management authorization is appropriate.

#### **3.4.2** *Validation of Hazard Identification Database (HEAR or Equivalent)*

The HEAR database is being used by the ES Division to track formal authorizations; however, the data needs updating to reflect renewal status. Additionally, most hazards are identified in ES Division space, but could use improvement with listing hazardous equipment, especially machine shop equipment in B64.

### **3.5 Nontechnical Space/Operations**

As discussed in Section 1.2, the IFA team performed a representative review of ES Division work conducted in office spaces. The team reviewed the office locations listed in Section 2.3 (Figure 1).

The team classified their results as

- findings, or failures to comply with a regulatory requirement;
- observations, or opportunities for process improvement; and
- noteworthy practices.

The IFA team results are provided in Appendix C, Technical Environment, Safety, and Health Inspection Results.

### **3.6 Database and Past Audit Review**

#### **3.6.1 *LCATS Database***

The ES Division uses the LCATS system effectively and routinely to track findings. Recent electrical and ES Division line management walkthrough findings have been entered. As part of ES Division's self-assessment for 2005, there were 105 entries consisting of two incomplete items and one on schedule for completion. The completion rate is 97%. The ES Division has already begun the process of entering and closing out the findings from this year's IFA.

#### **3.6.2 *CMS Database***

As part of ES Division's self-assessment for 2005, the division reviewed its use of the Chemical Management System (CMS) database to manage chemical inventory. Ninety-five percent (95%) of ES Division chemical owners have updated the CMS database.

#### **3.6.3 *SAAR Database***

In the past three years, the ES Division has had fifteen Supervisor's Accident Analysis Report (SAAR) cases of which two were recordable events. Of these 15 SAAR cases, almost half were computer ergonomic-related injuries. The ES Division is aware of these ergonomic cases and is taking steps to address it.



**Figure 2: ESD Safety Performance**

<b>Earth Sciences Division</b>	<b>7/1/02 – 6/30/03</b>	<b>7/1/03 – 6/30/04</b>	<b>7/1/04 – 6/30/05</b>
Total SAARS	4	3	8
Recordable Cases	0	0	2
TRC Rate	0	0	1.57
First Aid Cases	4	3	6
Lost Days	0	0	0
Restricted Work Days	0	0	0

#### **3.6.4 RWA Violations**

Descriptions of RWA violations for the period 7-01-02 through 6-30-05 are listed below. Corrective actions were identified for all violations and are on file with the EH&S Radiation Protection Group.

5-19-04 / RWA-1107:

Receipt or purchase of material greater than the authorized vial limit. On May 14, 2004, Operational Health Physics Transportation received 90 uCi of uranyl nitrate, which exceeded the authorized container limit of 50 uCi.

1-20-05 / RWA-1107:

Unauthorized work with radioactive material without required escort form.

3-31-05 / RWA-1016:

“Use of facilities for radiological work not authorized in the RWA.” While amending RWA-1016, it was discovered that radioactive material was stored in an improperly posted and unauthorized location at the Advance Light Source (ALS). The radioactive material was stored on the user floor at Beamline 1.4.3. RWA-

1016 identifies ALS Cabinet 25 as the only authorized radioactive material storage area (RSA) location for radioactive materials located at the ALS.

### **3.6.5 OSHA Inspection Results**

The ES Division has completed corrective actions on all issues identified during the 2004 OSHA inspection.

## **3.7 General Compliance Summary**

Overall, seismic hazards, housekeeping and electrical safety issues were the most common findings. The team also noted several findings related to OSHA compliance and in particular, machine guarding and safety in Building 64, Room 161.

## **4 Noteworthy Practices**

The IFA team identified several noteworthy practices which include the following:

- The Lab PI in 70-4459 promoted Lab Safety Primer and glove selection chart to the IFA team emphasizing commitment to safety. All ESD Labs have Lab Safety Primers.
- Joern Larsen has done an excellent job of maintaining a very organized and clean lab in 70-114.
- Housekeeping looks very good in 70A-4463 and the lab is very organized.
- Throughout Carol Ingram's (BSO) participation in the IFA, and subsequent interactions, she stated that she has been favorably impressed with the professional, proactive way Jil Geller (ES DSC) performs her safety responsibilities. Carol also mentioned that Jil pays attention, listens, takes action as appropriate, and demonstrates the important ability to get buy-in from the various players involved in safety. This is the way to build and nourish a safety culture.
- During the IFA review period, Rob Connelly (ES Division EH&S Liaison) participated in the ES Division line management walkthroughs of all ES Division labs, shops, and offices. These management walkthroughs are personally lead by the ES Division Director, Bo Bodvarsson, while the ES DSC, group leaders, and department heads also attend. The walkthroughs are an effective method for line management review of ES Division space and promoting workplace safety.

- The ES Division labs have up-to-date emergency response guides posted in all lab space.
- Given the matrix nature of the ES Division, each lab space has a designated “Lab Space Lead PI” that has the primary responsibility of identifying lab hazards and notifying others working in the lab space. This designation system was developed by the ES Division, which also includes the creation of custom lab entry signs, to clearly identify who has primary responsibility for the space.

## 5 Observations

Based on the IFA team’s technical ES&H reviews, observations are specific items or areas within the ES Division’s safety program that should be considered for improving safety within the Division.

- The HEAR database should be periodically updated to document formal authorizations and hazardous equipment.
- The findings of this IFA should be tracked in LCATS (currently in progress).
- Increased vigilance is suggested for ensuring ES Division staff have the appropriate work station ergonomics training and work station evaluations conducted.
- The flammable liquids cabinet in 70A-4459 should be evaluated within the ES Division to determine if there are other options to allow for adequate access to the cabinet.
- The capacity of the acetylene cylinder in 70-158 should be evaluated by the ES Division to determine if there is a demonstrated need for the amount.
- Tremendous housekeeping improvements have been made in 51F; however, it is recommended that progress continue to be made in Rooms 101 and 102 to eliminate tripping hazards and to secure items.
- As part of the ES Division line management walkthroughs or other line management process, the hazardous equipment stored in cargo containers located near B64 and also the ES Division field vehicles, should be included as part of these reviews. Consideration should be given to a review of equipment/vehicle operational status and service records.
- There have been several RWA violations during the last three year IFA period. Increase vigilance is warranted in the area of compliance with RWAs.

## **6 Findings**

The results of the IFA team's technical ES&H reviews are listed in Appendix C, Technical Environment, Safety, and Health Inspection Results; Appendix D, SAA Inspection Results; and, Appendix E, Electrical Inspection Results.

## **7 Conclusion**

Overall, the ES Division has a strong ES&H program that is effective in identifying and controlling hazards. ES&H has the support of the ES Division management, an effective safety committee, and an active ES&H coordinator.

The IFA team identified several noteworthy practices and opportunities for improvement. Increased vigilance is warranted in the areas of seismic safety, office ergonomics for students, housekeeping and machine guarding / safety.

# Appendices

Appendix A List of Formal Authorizations

Appendix B List of Line Management Authorized Operations

Appendix C Technical Environment, Safety, and Health Inspection Results

Appendix D SAA Inspection Results

Appendix E Electrical Inspection Results

## **Appendix A List of Formal Authorizations**

### Activity Hazard Documents (AHDs)

- AHD 2046; Gas Hydrates Experiment; 64 Highbay; Barry Freifeld
- AHD 2065; Lasers in Microscope; 70A-4463; Terry Hazen
- AHD 2105 (In preparation); Single Location Saturation CO<sub>2</sub> Monitoring; 51F; Liviu Tomutsa

### Biological Use Authorizations (BUAs)

- BUA B107; Microbial community dynamics, molecular tracking, and ecology of human pathogens in the environment; 70A-4463 and 4475; Gary Andersen
- BUA B141; Genotyping using high density arrays; 70A-4475; Gary Andersen
- BUA B142; Rapid sequencing by hybridization system for comprehensive pathogen diagnostics; 70A-4475; Gary Andersen

### Radiological Work Authorizations (RWAs)

- RWA 1107; Desorption of Uranium on Soil; Class II; B70-114 & 70A-1105, 70A-4459; Tetsu Tokunaga
- RWA 1125; Use of Uranium Spectroscopic Solution; Class I; 70A-4429; John Christensen
- RWA 1152; Analysis of the 81Kr and 85K4 Swiss Spike by Mass Spectrometry; Class I; 70A-4419; Burton Kennedy
- RWA 1154; Processing of Soil Cores; Class I; 70A-4459; Sharon Borglin

### Sealed Source Authorizations (SSA)

- SSA 140; Sources housed in hydroprobe instrument; Class II; 70A-4463; Susan Hubbard

### Generally Licensed Authorizations (GLA)

- #414; Three licensed static eliminators used in clean room; 70A-4404A; Todd Wood
- #406; Two GCs; 70A-3317; Will Stringfellow
- #412; Two licensed sources in X-Ray scanner core analyzer; 64 Highbay; Barry Freifeld

- #417; Three static eliminators integral to lab equipment; 70-143; Deb Williard

#### Low Activity Source Authorizations (LAS)

- #L012; Authorization for TH-nat and U-nat from coupled plasma-mass spec; 70A-4405; Todd Wood
- #L014; Authorization for radionuclides from soil and groundwater samples; 70A-4463B; Terry Hazen
- #L007; Authorization for radionuclides from soil and water samples from Hanford; 70A-4413, 4419, 4425, 4429 and 4431; Mark Conrad

#### X-Ray Authorization

- Liviu Tomutsa; CT Scanner; 51F-102

#### Benchtop Acid Neutralization Procedures (BANP)

- Joern Larsen; 70-114; Acidic radioactive/mixed waste
- Joern Larsen; 70-114; Radioactive/mixed waste from uranium analysis with KPA
- Tryg Lundquist; 70-158; Acid waste from ICP

#### Satellite Accumulation Areas (SAAs)

51-007	70A-2275
64-163	70A-2275C
70-114	70A-4403
70-114A	70A-4405
70-116	70A-4419
70-120	70A-4429
70-131A	70A-4431
70-158	70A-4461
70A-2235	70A-4463
70A-2253	70A-4463B

## Appendix B List of Line Management Authorized Operations

As stated in PUB-3000, operations are considered authorized under a division's self-authorization if the process and hazards control are routine and conform to the individual division's ISM plan, and individuals are trained as specified by the JHQ. The following list includes line management authorized Off-Site Safety and Environmental Protection (OSSEP) Plans in the ES Division. Line management authorizations that received an integrated review by EH&S are highlighted in yellow.

LBNL ESD OSSEPP YR	LBNL ESD OSSEPP	Account	Project Title	Principal Investigator	Site	Site Owner/Manager	Collaborating Organ	Initial Signature Date	Revision Date/ Comments
05	01	G3W038	Stress Monitoring with seismic travel times at RFS	Tom Daley	Richmond Field Station	UC Berkeley	None	1/26/2005	
05	02	w/ UCB	Optimal Vineyard Development using Geophysical Techniques	Susan Hubbard & Yoram Rubin	Dry Creed Valley, Sonoma	CiChiro Properties-owner, Phil Freeze- manager	UCB	2/25/2005	



LBNL ESD OSSEPP YR	LBNL ESD OSSEPP	Account	Project Title	Principal Investigator	Site	Site Owner/Manager	Collaborating Organ	Initial Signature Date	Revision Date/ Comments
05	04	G22207	An Annual Grassland Mesocosm Exploration of Scaling from Genomes to Ecosystem Function	M.S. Torn and M. Firestone	Sedgwick and Hopland Reserves/	University of California	UCB	3/7/2005	
05	05	G60671	Peña Blanca Science Plan: Building Confidence in Yucca Mountain Performance through the Peña Blanca Natural Analogue	A. Simmons (LANL), P. Dobson (LBNL)	Peña Blanca field area, Chihuahua, Mexico	Owner: Sr. Don José Licón; Managing Agency: Consejo de Recursos Minerales/ Instituto de Ecología	Autonomous University of Chihuahua (AUCH), Los Alamos National Laboratory (LANL), University of Tennessee Knoxville (UTK), University of Texas at El Paso (UTEP), Institute of Ecology	3/16/2005	Supersedes 04-10
05	06	G3W003	Tube-Wave Monitoring	Valeri Korneev	Rocky Mountain Oil Testing Center (RMOTC)	DOE	Shell Oil Co.	3/22/2005	

LBNL ESD OSSEPP YR	LBNL ESD OSSEPP	Account	Project Title	Principal Investigator	Site	Site Owner/Manager	Collaborating Organ	Initial Signature Date	Revision Date/ Comments
05	07	G60651	Natural Analogue Studies of the Drift Shadow Effect	Tim Kneafsey	Black Diamond Mine, Antioch CA	EBRD	EBRD	5/11/2005	
04	01	G20401	GEOSEQ	Larry Myer/Sally Benson	South Liberty Oil Field, TX	TBEG	Sandia Technologies, USGS, TBEG, Oak Ridge National Lab, NETL	2/5/2004	
04	02	81CB01	Fort Ord Groundwater Remediation: Enhanced Water Quality Monitoring	Curt Oldenburg	Fort Ord, Marina, CA OU1	U.S. Army, University of California/ HydroGeologic	LLNL, UC, HydroGeologic, US Army Corps of Engineers	3/9/2004	05/10/04 (revision not signed)
04	03	G32201	Drilling for Methane Hydrates	Barry Freifeld	Currently Gulf of Mexico/TBD		Chevron Texaco, Fugro Geoservices, Scripps Institution of Oceanography	3/30/2004	
04	04	Various	Ocean Biogeochemical Processes Group: Work at sea	Jim Bishop	Territorial and International Ocean Waters/Ship Operator	N/A	Various	5/27/2004	

LBNL ESD OSSEPP YR	LBNL ESD OSSEPP	Account	Project Title	Principal Investigator	Site	Site Owner/Manager	Collaborating Organ	Initial Signature Date	Revision Date/ Comments
04	05		Collaboration with NASA's Bio-Mars project	Mack Kennedy	Tributaries to the Snake River on the Snake River Plain, Idaho	National Forest Service	NASA	5/27/2004	
04	07	GW4027	Watershed Contributions of Metals to Cook Inlet	Christopher Guay	Cook Inlet, AK	Cook Inlet Regional Citizens Advisory Committee (CIRCAC)	CIRCAC; Kachemak Bay National Estuarine Research Reserve	7/16/2004	
04	08	522701	Active Source Monitoring	Ernie Majer / Tom Daley	Parkfield SAFOD Well	SAFOD Program- Mark Zoback / Steve Hickman	Carnegie Institute, Duke Univ., Thermo Source (SAFOD drilling operation)	10/7/2004	5/11/2005
04	09	G32401	Microhole	Ernie Majer	DOE/Rocky Mountain Oil Test Center	DOE		11/1/2004	
03	02	G31801	Characterization of Methane Hydrate Bearing Core	Barry Freifel	Anadarko/North Slope Drill Site	Anadarko Petroleum	Anadarko Petroleum. Noble Corporation	3/13/2003	

LBNL ESD OSSEPP YR	LBNL ESD OSSEPP	Account	Project Title	Principal Investigator	Site	Site Owner/Manager	Collaborating Organ	Initial Signature Date	Revision Date/ Comments
03	04	81CU01; 80GX01	Real-time flow and temperature monitoring	Nigel W.T. Quinn	Several : Middle San Joaquin River; San Luis NWR; Grassland WD	State of California; San Luis NWR; Grassland WD	US Bureau of Reclamation; San Luis NWR, Grassland WD	7/15/2003	Revised 3/23/05;Sup ercedes 01- 02
03	05	G319- 15/4682- 02	Fieldwork for sampling geothermal wells and hot and cold springs	B. Mack Kennedy	Diverse areas and locations	Multiple, mainly public lands	USGS, Nevada Bureau of Mines, University of Nevada @ Reno		9/29/2004
02	01	5227-01	Seismic Stimulation	E. L. Majer/Tom Daley	Lost Hills/Elk Hills, CA	AERA Energy, Occidental of Elk Hills	AERA		Missing OSSEPP; revised April 2004 (rev form not signed)
02	05	UCB Account	Estimation of Water Content Using Surface CPR: Development of a Precision Agricultural Tool	Susan Hubbard	Dehlinger Winery	Tom Dehlinger		6/3/2002	
02	06	80NB28	Moisture Monitoring and Drift Seepage Testing, Yucca Mtn.	Joseph S. Wang	Nevada Test Site	DOE Yucca Mountain Project/ DOE Nevada Operations Office	DOE Nevada Operations Office	Missing OSSEPP	Revised from 97-13

<b>LBNL ESD OSSEPP YR</b>	<b>LBNL ESD OSSEPP</b>	<b>Account</b>	<b>Project Title</b>	<b>Principal Investigator</b>	<b>Site</b>	<b>Site Owner/Manager</b>	<b>Collaborating Organ</b>	<b>Initial Signature Date</b>	<b>Revision Date/ Comments</b>
02	07	G30801	Ocean Development of LBNL Linear X-ray Scanner	Barry M. Freifeld	Cascadia Ridge, off Oregon Coast	Texas A&M University/Ocean Drilling Program (ODP)	A&M University	7/19/2002	
02	09	G30330	Three Dimensional Magnetotelluric Investigation of Kilauea	G. Michael Hoversten	Kilauea, Hawaiian National Volcano Park, Hawaii	National Park Service/LBNL	USGS	6/21/2002	10/17/2003
01	03	4695-01	Carbon and Water Cycling at the ARM Southern Great Plains Site	Margaret S. Torn		DOE Atmospheric Radiation Measurement Program	Carnegie Institution of Washington	8/3/2001	revised 5/9/05
00	05	80NB-28;80NB-52	Thermal & Hydrological Testing in the ESF, Yucca Mtn. NV	Yvonne Tsang and Joe Wang	Nevada Test Site	DOE Yucca Mountain Project	DOE Nevada Operations Office	7/21/2000	06/24/02; supercedes 96-03

## Appendix C Technical Environment, Safety, and Health Inspection Results

### Findings

Team Member	Building	Room	Finding	Action	Level of Concern*
Bell	70A	4419	Variac transformer under unistrut bench behind computer has a damaged cord.	Repair cord.	
Bell	70A	4419	Heater tape leads repaired with electrical tape.	Replace heater tape.	
Bell	70A	4419	Metal backed electrical plug has fiber insulator.	Replace cord cap.	
Bell	70A	4431	Refrigerator not secured.	Contact the Facilities Work Request Center to have items secured.	
Bell	90	2016	Items stored on top of bookshelves in NE corner are not secured.	Relocate items or secure.	
Bell	90	2016	Items are stored over lip of book shelves in NE corner of room.	Relocate items or secure properly behind shelf lips.	
Candelario	64	163	No breaker schedule for panel 34A3A	Rob Connelly submitted a work request for Facilities to correct this.	
Candelario	70	114	Junction box above room light switch missing cover.	Install cover.	
Connelly	64	160	Hot plate stored below microwave has burned cord.	Repair cord or discard hot plate.	Low
Connelly	64	160	Eyewash safety shower last inspected 11/21/04.	Request Facilities to inspect quarterly.	Low

Team Member	Building	Room	Finding	Action	Level of Concern*
Connelly	64	160	There are a couple of hand saws that are hanging from the side of a metal cabinet that can cut a passerby.	Relocate saws to a safer area.	Low
Connelly	64	160	Spring is disconnected from flammables storage cabinet; east wall.	Reconnect spring to allow for doors to self-close.	Low
Connelly	64	161	Air blow gun doesn't have blow by air relief.	Purchase air blow gun from B78 Stores that meets OSHA requirements.	Low
Connelly	70	158	CO <sub>2</sub> and helium regulators on cylinders, but not in use.	Remove regulators from compressed gas cylinders not in use, and replace the valve protective cap.	Low
Connelly	70	158	Three refrigerators are missing " <i>no food storage</i> " labels.	Obtain labels from B78 Stores, and label refrigerators.	Low
Connelly	70A	3317	Refrigerator missing " <i>food storage only</i> " label.	Obtain label from B78 Stores and label refrigerator.	Low
Connelly	70A	4419	Some chemical containers need improvement with labeling and secondary containment.	Label containers with name of material and its primary hazard. Liquid solutions need secondary containment.	Low

Team Member	Building	Room	Finding	Action	Level of Concern*
Connelly	70A	4419	Gas cylinder bench lying on side without valve protection cap.	Place valve protection cap on cylinder, and store cylinder appropriately.	Low
Connelly	70A	4421	Small helium gas cylinder on workbench unsecured.	Secure to prevent tipping/falling.	Low
Connelly	70A	4459	Regulator is on gas cylinder, but cylinder is not in use.	Remove regulators from compressed gas cylinders not in use, and replace the valve protective cap.	Low
Connelly	70A	4459	Flasks in Hood #4 not labeled and don't have secondary containment.	Label containers with name of material and its primary hazard. Liquid solutions need secondary containment.	Low
Connelly	70A	4463	Chloroform in hood does not have secondary containment.	Provide secondary containment.	Low
Connelly	70A	4463	Refrigerator missing " <i>chemical storage only</i> " label.	Obtain labels from B78 Stores and label refrigerators.	Low
Connelly	70A	4463B	Chemical containers labeled with contents, but not primary hazard.	Label containers with name of material and its primary hazard.	Low
Connelly	90	2016B	Jiming Jin needs an ergo eval.	Submit a request for an ergo eval.	Low
Fairchild	70A	3317	Several ergo issues with regard to the lack of computer trays and inadequate furniture in general.	Evaluate need for ergo evaluations and furniture.	



<b>Team Member</b>	<b>Building</b>	<b>Room</b>	<b>Finding</b>	<b>Action</b>	<b>Level of Concern*</b>
Fairchild	70A	3317J	Electrical daisy-chain issue corrected on the spot.	Corrected on the spot.	
Fairchild	70A	3317L	No space for duck, cover, and hold. Area under desk was filled with books.	Remove books.	
Fairchild	70A	4463B	The required 3/4-inch lip was in place on the shelves; however, items on one shelf were stacked two to three high, and the upper two levels were above the restraint, thus they would fall during an earthquake.	Reorganize shelves to limit stacking.	
Kotowski	51F	102	Compressed gas cylinders not in use were stored with their regulators on.	Remove regulators from compressed gas cylinders not in use, and replace the valve protective cap.	
Kotowski	51F	102	Flexible cords were fastened to building steel and to electrical conduits.	Do not fasten flexible cords to the building. Do not fasten anything to electrical conduit or other electrical equipment.	
Kotowski	51F	102, 103	Housekeeping was poor.	Improve housekeeping to eliminate tripping hazards.	
Kotowski	51F	103	The flammables cabinet was not secured and was not grounded.	Secure the flammables cabinet to the floor and provide a grounding strap from the cabinet to building steel.	

<b>Team Member</b>	<b>Building</b>	<b>Room</b>	<b>Finding</b>	<b>Action</b>	<b>Level of Concern*</b>
Kotowski	64	161	The saw blade on the band saw was not guarded adequately.	Provide a full guard on the band saw, above the table and below the table.	
Kotowski	64	161	The belt and pulley guard on the small drill press was inadequate.	Completely enclose the belt and pulley mechanism on the small drill press.	
Kotowski	64	161	The chuck guard on the large lathe was missing.	Reinstall the chuck guard on the large lathe and keep in place at all times when the lathe is in use.	
Kotowski	64	161	The chuck guard on the small lathe was not properly mounted.	Mount the chuck guard securely using 2 bolts so that it cannot be rotated sideways. Adjust the ventilation system as needed to allow for proper ventilation when the guard is in place.	
Kotowski	64	161	A large amount of the surface of the belt sander was exposed because the adjustable guard was missing.	Provide additional guarding for the face of the belt sander, exposing only the amount of belt needed for each job.	
Kotowski	64	161	The belt sander was fixed to the floor and powered by a cord plugged into a wall outlet.	Provide hardwiring for the belt sander, as is required for all fixed equipment.	

<b>Team Member</b>	<b>Building</b>	<b>Room</b>	<b>Finding</b>	<b>Action</b>	<b>Level of Concern*</b>
Kotowski	64	161	The tool rest on the grinding wheel was not properly adjusted.	Keep the tool rest adjusted to within 1/8" of the wheel at all times.	
Kotowski	64	161	The retaining tongue on the grinding wheel was missing.	Install a retaining tongue on the grinding wheel and keep it adjusted to within 1/4-inch of the wheel at all times.	
Kotowski	64	163	There were several unsecured storage cabinets.	Provide seismic tie-downs for all storage cabinets in the HiBay.	
Kotowski	64	163	There was an unsecured granite table.	Provide seismic anchoring for the granite table. (This table is very heavy and will require a structural engineering design; submit Facilities Work Request for design and installation of anchoring.)	
Kotowski	64	163	An acetylene cylinder was secured to building steel with a webbing strap.	Secure acetylene cylinder using a metal chain. LBNL policy does not allow the use of webbing straps.	
Kotowski	70	158	Two refrigerators without seismic restraints were noted, but restraints have been ordered.	Install the restraints for the refrigerators as they are received.	

<b>Team Member</b>	<b>Building</b>	<b>Room</b>	<b>Finding</b>	<b>Action</b>	<b>Level of Concern*</b>
Kotowski	70	158	The acetylene cylinder was connected to the AA unit with a combustible hose, which was secured with water hose clamps.	Replace the combustible hose with metallic tubing and gas rated fittings. (Suggest a Facilities Work Request be written to have this installed.)	
Kotowski	70	158	The Argon system supplying the AA unit does not have any pressure-relief device.	Provide a pressure relief device immediately downstream of the regulator for the Argon gas system. The relief device needs to be set no higher than the Maximum Allowable Working Pressure of the lowest rated component in the system.	
Kotowski	70A	3317D	Four file cabinets were bolted to each other, but were not secured to the wall or floor.	Submit a Facilities work request to anchor file cabinets properly.	
Kotowski	70A	3317H	Two file cabinets were stacked on top of each other, creating a seismic issue and an issue of safe access to the contents of the upper file cabinet.	Remove the upper file cabinet, and do not stack furniture on top of each other.	
Kotowski	70A	3317L	Excessive amounts of material on the floor constitutes tripping hazards,	Remove material from floor to create safe aisles and walking spaces.	

<b>Team Member</b>	<b>Building</b>	<b>Room</b>	<b>Finding</b>	<b>Action</b>	<b>Level of Concern*</b>
Kotowski	70A	3317L	5 file cabinets were bolted to each other but did not appear to be secured to the wall or floor.	Verify that cabinets are properly anchored, or bolt them to the structure as required.	
Kotowski	70A	4429	Access to the circuit breaker switch labeled "Isoprobe" was obstructed.	Keep clear an area 30 inches wide by 36 inches deep in front of this electrical switch at all times.	
Kotowski	70A	4429	Only 40 inches of clearance was present in front of the 480V panel.	Maintain 42 inches of clearance in front of the 480V electrical panel. (Matt Kotowski will contact Facilities to have the label on the panel changed.)	
Kotowski	70A	4429	The 480V transformer had large ventilation openings that create the possibility of inadvertent insertion of metal objects into the openings.	Submit a Facilities Work Request to have the openings screened by electricians with hardware cloth with no openings greater than 1/4 inch. THIS MUST BE DONE BY QUALIFIED ELECTRICIANS AND MAY NOT BE DONE BY DIVISION PERSONNEL.	
Kotowski	70A	4429	Radiation monitoring equipment and other materials were stored on top of the 480V transformer.	Remove all materials from the top of the transformer.	

<b>Team Member</b>	<b>Building</b>	<b>Room</b>	<b>Finding</b>	<b>Action</b>	<b>Level of Concern*</b>
Kotowski	70A	4429	Aisles were obstructed, and in one place the aisle was only 12 inches wide. PI is waiting for software upgrade prior to making arrangements to fix this item.	Provide and maintain aisles as required by OSHA. Aisles leading to exits must be a minimum of 28 inches wide; all other aisles must be at least 24 inches wide. (Access to the rear of equipment is not considered an aisle and can be narrower.)	
Kotowski	70A	4429	There was no pressure relief on the compressed gas systems located in the ante-room. System was designed by Facilities without pressure relief.	Provide a pressure relief device immediately downstream for the regulator for each compressed gas system. The relief device needs to be set no higher than the Maximum Allowable Working Pressure of the lowest rated component in the system.	
Wentworth	51F	101	Ergo evaluations are needed for computer workstations.	Schedule an ergo evaluation.	
Wentworth	51F	101	Shelf above desk area and equipment on the desks need to be secured. Tops of shelves not secured. No shelf lips noticed.	Contact the Facilities Work Request Center to have items secured and lips installed.	

<b>Team Member</b>	<b>Building</b>	<b>Room</b>	<b>Finding</b>	<b>Action</b>	<b>Level of Concern*</b>
Wentworth	51F	101	Cable and wiring lying on the floor coming from the spectrometer.	Remove/secure.	
Wentworth	51F	101	Top chain of tall bookshelf in the back of the room not fastened for earthquake.	Fasten chain.	
Wentworth	51F	101	Maintain walking areas and desktops free of misc. debris.	General housekeeping improvements needed.	
Wentworth	64	163	Various cabinets are not earthquake restrained	Have cabinets secured to the wall.	
Wentworth	64	163	Tops of cabinets have rolls of rope and misc. items on top of them.	Remove all of equipment from the top of the cabinets.	
Wentworth	64	163	Materials stored in front of the beaker boxes.	Remove materials in front of the beaker boxes.	
Wentworth	64	163	Wires on the floor near the workbenches.	Clean up and remove the wiring.	
Wentworth	64	163	Debris stored in front of the electrical panel.	Remove the debris.	
Wentworth	64	163	Empty, used bottles and beakers stored next to the microwave, which is used for food.	Store bottles in another location.	
Wentworth	64	163	Microwave is not secured to the tabletop.	Secure microwave.	
Wentworth	64	163	Ceiling tiles are falling down; possibly may contain asbestos.	EH&S IH will evaluate for asbestos.	

<b>Team Member</b>	<b>Building</b>	<b>Room</b>	<b>Finding</b>	<b>Action</b>	<b>Level of Concern*</b>
Wentworth	64	Room 161	Homemade box over the desk area and is not secured.	Remove homemade box.	
Wentworth	64	Room 161	Tops of cabinets have a lot of debris on top of them.	Remove debris.	
Wentworth	64	Room 161	Broken table sitting on its side near punch drill.	Remove or fix table.	
Wentworth	64	Room 161	Large tool blocking an electrical outlet.	Remove the tool.	
Wentworth	64	Room 161	Work table in front of a breaker box.	Remove the table.	
Wentworth	70	158	Office chairs blocking exit.	Rearrange desks/chairs to avoid blocking exit.	
Wentworth	70	158	Ergo evaluations appear to be needed for computer workstations.	Schedule an ergo evaluation.	
Wentworth	70	158	Items hanging from pipes; cabinets blocked by debris; table blocks access to centrifuge; numerous debris on top of the shelves.	General housekeeping improvements needed.	
Wentworth	70	158	Book cases on top of desks are not seismically secured, and shelf lips don't appear to be present.	Contact the Facilities Work Request Center to have items secured and lips installed.	
Wentworth	70A	3317H	No keyboard tray.	Have ergo done on workstations.	



<b>Team Member</b>	<b>Building</b>	<b>Room</b>	<b>Finding</b>	<b>Action</b>	<b>Level of Concern*</b>
Wentworth	70A	3317H	Loose books on overhead shelf above the computers; no earthquake protection/Ladder out of place.	Have earthquake proof shelving in place.	
Wentworth	70A	3317M	No duck-and-cover room under desk; books need to be picked up.	Clean area under desk and find a home for books.	
Wentworth	70A	4459	Cart blocking main door and shower.	Move cart.	
Wentworth	70A	4463C	No computer keyboard trays; low monitor; also needs new chairs.	Have ergo evaluation done on work stations.	

\* All industrial hygiene findings are classified as high, medium, or low level of concern

**Observations**

<b>Team Member</b>	<b>Building</b>	<b>Room</b>	<b>Observation*</b>	<b>Action</b>
Connelly	70	158	Chemicals are stored in shelves alphabetically vs. by hazard category. PI indicated chemicals are stored alphabetically by hazard category.	Verify chemicals are stored by hazard category. Not recommended practice to store chemicals alphabetically. Label shelves by hazard category vs. A-Z.
Connelly	70A	4459	Flammables storage cabinet is difficult to access chemicals safely.	Opportunity for improvement by relocating cabinet to safely access chemicals. However, due to limited space, this may not be possible.
Kotowski	70	158	The acetylene cylinder appears to be larger than necessary. (The cylinder contains a maximum of 320 cu ft and is below the 400 cu ft limit, so it is permissible if needed.)	Evaluate the use requirements for acetylene. Unless there is a demonstrated need for this size cylinder, suggest that a smaller cylinder be used.
Connelly	51F	102 & 102	Improvements have been made with regard to housekeeping; however, improvements are still needed.	Improvements should continue to eliminate tripping hazards and to secure items.

**Noteworthy Practices**

<b>Team Member</b>	<b>Building</b>	<b>Room</b>	<b>Noteworthy Practice</b>
Connelly	70A	4459	Lab PI promoted Lab Safety Primer and glove selection chart to the IFA team emphasizing commitment to safety. All ESD Labs have Lab Safety Primers.
Wentworth	70	114	Joern Larsen has done an excellent job of maintaining a very organized and clean lab.
Wentworth	70A	4463A	Housekeeping looks very good. Lab is organized.
Ingram			Throughout Carol Ingram's (BSO) participation in the IFA, and subsequent interactions, she stated that she has been favorably impressed with the professional, proactive way Jil Geller (ESD DSC) performs her safety responsibilities. Jil pays attention, listens, takes action as appropriate, and demonstrates the important ability to get buy-in from the various players involved in safety. This is the way to build and nourish a safety culture.
Connelly			During the IFA review period, Rob Connelly (ESD EH&S Liaison) participated in the ESD line management walkthroughs of all ESD labs, shops, and offices. These management walkthroughs are lead by the ES Division Director, Bo Bodvarsson, while the ESD DSC, group leaders, and department heads also attend. The walkthroughs are an effective method for line management review of ESD space and for promoting workplace safety.
Connelly			Given the matrix nature of the ES Division, each lab space has a designated "Lab Space Lead PI" that has the primary responsibility of identifying lab hazards and notifying others working in the lab space. This designation system was developed by the ES Division, which also includes the creation of custom lab entry signs.

## Appendix D SAA Inspection Results

Building	Room	Space/Activity Description	Lab-space Lead PI	Lab Contact	SAA waste description	SAA Custodian	SAA inspection with M White
							4/21/2005 (WM=waste management)
Geochemistry, Don Depaolo, Dept. Head							
51	B conex	GeoChem Storage	Perry,Dale L	Alex Morales			
70	120	Geochemistry	Waychunas,Glenn A	Waychunas, Glen	Se, As, Cu solids	G. Waychunas	Empty SAA
70	143	Geochemistry	Kneafsey, Tim	Kneafsey, Tim	Acids, Bases	Carl Steefel/Li Yang	WM to resolve status of chemicals with PI 4/26
70	279	Geochemistry	Torn,Margaret S	Williard,Deb E			
070A	4403	Geochemistry	Torn,Margaret S	M. Kleber	1. Solvents, corrosives. 2. Haz waste ??	M. Kleber	No problems
070A	4405	Geochemistry	Bishop,James K	Wood,Todd J	1. Hood HCl., HNO3, 2. ICP waste HCl	Wood,Todd J	Empty SAA
070A	4405A	Geochemistry	Bishop,James K	Wood,Todd J			
070A	4413	Geochemistry (CIG)	Kennedy,Burton M	Woods,Katharine N			
070A	4413A	Geochemistry (CIG)	Conrad,Mark S	Woods,Katharine N			
070A	4419	Geochemistry	Kennedy,Burton M	van Soest,Matthijs C	org solvents, acids	Woods,Katharine N	Empty SAA, but need to replace containment tub
070A	4421	Geochemistry	Kennedy,Burton M	van Soest,Matthijs C			
070A	4425	Geochemistry	Conrad,Mark S	Woods,Katharine N			
070A	4429	Geochemistry	Christensen,John N	Christensen,John	acids	Christensen,John	Flam can has waste in it, but there is no label or accumulation log for the waste. PI says it is water collected from a leak, and will discuss proper disposal with WM.
070A	4431	Geochemistry (CIG)	Conrad,Mark S	Woods,Katharine N	1-corrosives; 2- solvents	Woods,Katharine N	No problems, but check pH on carbonate waste to verify if corrosive (not corrosive if 2<pH<12.5) and correct label
070A	4458	Geochemistry	Torn,Margaret S	Cooley,Heather S			
Ecology, Terry Hazen, Dept. Head							
14	137	soil sample processing	Quinn,Nigel Wt	Kate Huckelbridge			
70	158	Geochemistry	Bailey Green	Lundquist,Tryg	liquids & solids /w trace metals fr ICP	T. Lundquist	No problems
70	158	Geochemistry	Bailey Green	Lundquist,Tryg	acids & metals	Carl Steefel/Li Yang	No problems
70	166	Geochemistry	Stringfellow,William T	Alusi,Thana			
070A	2235	Hydrology&Wetlands Studies	Stringfellow,William T	Hanlon,Jeremy	corrosives & organics	J. Hanlon	No Problems
070A	2253	Microbial Background Studies	Andersen, Gary	Piceno, Yvette	phenols, chloroform (hood)	Piceno, Yvette	Make sure contaminated solids bag is completely closed.
070A	2275	Ecology	Holman,Hoi-Ying	Holman,Hoi-Ying	solvents	K. Brooks, E. Wozel, H-Y. Holman	No Problems. SAA sign NOT needed for GCMS daily accumulation.
070A	2275B	Ecology	Holman,Hoi-Ying	Holman,Hoi-Ying			
070A	2275C	Ecology	Holman,Hoi-Ying	Holman,Hoi-Ying	1. biohazard (BSL-1), 2. Rads ??	H-Y Holman	No Problems
070A	4459	Enviromental Biotechnology	Hazen,Terry C	Joyner,Dominique C	setting up for HF work	temporary-dismantled	No Problems
070A	4461	Enviromental Biotechnology	Hazen,Terry C	Joyner,Dominique C	(Life Sciences)	T. Torok	No Problems
070A	4462	Enviromental Biotechnology	Hazen,Terry C	Hazen,Terry C			
070A	4463	Ecology	Hazen,Terry C	Borglin,Sharon E	acids & organics	Borglin,Sharon E	No Problems
070A	4463A	Ecology	Hazen,Terry C	Borglin,Sharon E			
070A	4463B	Ecology	Hazen,Terry C	Borglin,Sharon E	rad waste	?	No Problems
070A	4463C	Ecology	Hazen,Terry C	Borglin,Sharon E			
Geophysics, Kurt Nihei, Dept. Head							
51F	102	G&G CAT Scan Lab	Tomutsa,Liviu	Tomutsa,Liviu			
51F	103	CAT Scan Cntrl Room	Tomutsa,Liviu	Tomutsa,Liviu			
Hydrogeology, Curt Oldenburg, Dept. Head							
14	118	Yucca Mtn Proi	Salve,Rohit	Salve,Rohit			

## Appendix E Electrical Inspection Results

Location	Finding/Comments
64-163	Relocate items near the two electrical panels on the east wall to maintain 3 ft clearance.
64-163	Do not store compressed gas bottles on cart; carts are only for moving the tanks.
64-163	Submit a work request to have the eyewash inspected (this should be done every 3 months).
70A-4429C	Remove the power strip from the wall near hood, and plug everything into wall receptacles.
70A-4405	Todd will submit work request for lock on FPU-026-70A box; Rob Candelario will check if receptacles 31A198-15 near DW spigots have GFCI (no trip/test buttons visible).
70A-4405	Inner room: Todd will submit work request to have eyewash in inner room inspected; Jil will get info about permit for live electrical work on mass spec for manufacturer's service rep coming onsite; Rob Candelario will check on access to breaker (took photo).
70A-4413	Larry will replace faceplate of an electrical receptacle; Rob Connelly will talk to Larry McLouth regarding eyewash being too close to electrical panel (is it needed? should it be angled to other side, and electrical spot-welder relocated?); Rob Candelario will look into acceptability of wiring on Lesko pumps and if they should be terminated with connectors; repair or lock out magnet with frayed cord. Bob Candelario will check on cord splicing/repair requirements.
70A-4413A	Mark will affix power strip to purge and trap cart, and plug everything else (except computers and peripherals) into wall receptacles.
70A-4419	Power strips behind Mark's ovens; plug drying ovens directly into wall. Furnace with taped wiring will be removed; broken hot plate will be thrown away, or power cord cut. Remove connections to yellow extension cord and plug into receptacles; repair frayed cords, and cords with tape (on Variac?).
70A-4431	Mark will rearrange plugs behind auto sampler so only computer and peripherals are in power strip; tag magnet with frayed cord and get cord plug LOTO box from Lab Stores; Rob Candelario will check on safety requirements for O2/CO2 converter.
51-007	The refrigerators and associated equipment that are not temporary and not computer/peripherals need to be unplugged from the power strip, and if you need power, plugged into the drops.
51-007	The modem in the cable tray above the refrigerator needs to be moved; it could be plugged into the power strip.

Location	Finding/Comments
51-007	The electrical plugs that run along the east and west walls of the lab do not have GFCI; even though there are water spigots every few feet. The most expedient thing would be to shut off the water supply to all the water spigots (maybe there is one location for each side). You could submit a work request or call facilities to see what they could do, but please try to get it done ASAP.
90P	Water cooler moved away from the electrical receptacle, and seismically secured. Plug the computers directly into the UPS and not via the surge protector/power strip.
70-114	Install waterproof cover on fan switch next to safety shower and GFCI on receptacles opposite shower, and to right of sink on south wall.
70-166	There are two areas in the room where water outlets are too close to electrical outlets without GFCI (the west hoods and bench opposite the east hoods).
70-143	South wall where there are water spigots directly below electrical receptacles: east of sink there is a permanent strip of outlets that were painted over, and so I couldn't tell if they were part of the GFCI circuit or not.
70-158	Extension cords cannot be used permanently; therefore they need to be removed from refrigerators in back of lab; either relocate refrigerators or have closer electrical receptacles installed. If you relocate the refrigerators, they will require the seismic bracing be reinstalled, which must be done through the Work Request Center. (Installation of electrical receptacles must also be done through the Work Request Center.)
70-158	Decommission or repair any equipment with frayed or otherwise compromised electrical cords and plugs, and be especially vigilant of older equipment. Two items—a pump from SERL and a multivessel mixer on the main bench—cannot be used until the cords are replaced. Cord replacement has to be done by a qualified electrical person. Please take the mixer positively out of service either by cutting the plug off or locking it. Please look at the older plugs that you have plugged into the power strip on the northeast wall of the lab and make sure they are all in good working condition (I couldn't really check them) without exposed wires and cracks, have a ground connector, and are not modified in any way.
70A-2275	An electrical cord in the small room to the right of the emergency shower that was behind the gas tanks was cracked and cannot be used until it is replaced. Please cut off the plug end, and if you need to use it, submit a work request to have it replaced. Please let me know the outcome.

Location	Finding/Comments
70A-2275	We looked at the power strips (officially called relocatable power taps), and I wanted to give you the current requirements for their use. They cannot be used as extension cords in lieu of permanent wiring. Generally, heaters, ovens, refrigerators, and fans > 600 watts must be plugged directly into the wall and cannot be plugged into power strips. If you are going to use a power strip for anything besides a computer and peripherals, please check that no single load exceeds 600 watts or 5 amperes, and that the total load on the strip does not exceed 1440 watts or 12 amperes. If you need more power outlets, please contact the Work Request Center.
70A-CEB labs	The only electrical safety issue I found in the CEB labs was regarding the use of power strips (officially called relocatable power taps), and I wanted to give you the current requirements for their use. They cannot be used as extension cords in lieu of permanent wiring. Generally, heaters, ovens, refrigerators, and fans > 600 watts must be plugged directly into the wall and cannot be plugged into power strips. If you are going to use a power strip for anything else besides a computer and peripherals, please check that no single load exceeds 600 watts or 5 amperes, and that the total load on the strip does not exceed 1440 watts or 12 amperes. If you need more power outlets, please contact the Work Request Center.
70A-4461	I am not sure about the power requirements of the microscopes in the microscope room that are plugged into the power strips. There are also many things plugged into power strips in 4461; probably the slide warmer and possibly the small centrifuge may exceed the allowable load on the power strip. Please let me know what you decide to do.
70-120	Glenn plans to request a qualified electrical person to complete assembly of the power rack used for bake-out, and it will have panels installed and a faceplate for the outlets to prevent exposure to wiring.